EARTH SATELLITE CORPORATION
(EarthSat)

2150 SHATTUCK AVENUE, BERKELEY, CALIFORNIA 94704 / (415) 845-5140

November 8, 1972

E72-10197
CR-128441

ERTS Contracting Officer
Code 245, GSFC
Greenbelt, Maryland 20771

Dear Sir:

Our first Type I Progress Report under our ERTS-A project, "Mineral Exploration Potential of ERTS-A Data," P-208, is enclosed.

We did not submit a progress report for the 30 June 1972 period since we had not yet received any ERTS imagery. For this reason we are combining our progress for these two periods into this report.

Our ERTS data for this project were received for our test site on the 27th, 30th, and 31st of October and the 1st and 3rd of November, 1972. A preliminary analysis of this imagery and other corollary data are discussed in the enclosed report.

Sincerely,

for William A. Brewer
Engineering Consultant

Encl.

EARTH SATELLITE CORPORATION
(EarthSat)

2150 SHATTUCK AVENUE, BERKELEY, CALIFORNIA 94704 / (415) 845-5140

November 8, 1972

E72-10197
CR-128441

ERTS Contracting Officer
Code 245, GSFC
Greenbelt, Maryland 20771

Dear Sir:

Our first Type I Progress Report under our ERTS-A project, "Mineral Exploration Potential of ERTS-A Data," P-208, is enclosed.

We did not submit a progress report for the 30 June 1972 period since we had not yet received any ERTS imagery. For this reason we are combining our progress for these two periods into this report.

Our ERTS data for this project were received for our test site on the 27th, 30th, and 31st of October and the 1st and 3rd of November, 1972. A preliminary analysis of this imagery and other corollary data are discussed in the enclosed report.

Sincerely,

for Robert O. Fawcett
William A. Brewer
Engineering Consultant

Encl.

TYPE I PROGRESS REPORT

Title: Mineral Exploration Potential of ERTS-1 Data, P-208, Contract No. NAS5-21745, GSFC #297

Principal Investigator: Dr. William A. Brewer

Summary of Accomplishments:

The main accomplishments in the reporting periods were:

1. Staffing and preparation to receive data.
2. Obtaining and compiling data onto transparency overlays to a base map of the target area. These transparencies are:
   a. Mineral locations of copper, molybdenum, and tungsten deposits
   b. Major geological structural features from published references
   c. Drainage map to aid in location of ERTS imagery
   d. Aeromagnetic contour map with a tectonic interpretation of the major anomalies

   All of the above are on a scale of 1:500,000 with duplication of some of the transparencies on a scale of 1:1,000,000.
3. A preliminary analysis of the ERTS imagery on a scale of 1:1,000,000 has been accomplished.

Significant Results:

The following are preliminary results of our examinations of the ERTS imagery:

1. Although the interpretation was accomplished on a scale of 1:1,000,000, it was necessary to use a X2 magnification on the prints in an effort to get greater detail in areas where differing grey levels corresponded to geological or vegetation changes. Whereas, a mosaic of two or three photos was necessary to see spacial regional lineations.

2. It was found that channel 7 of the MSS imagery had better contrast for detecting geological features. Channel 5 was found to be the next best.

3. Topographic features located south of Phoenix are easily identified from the surrounding alluvium, primarily by the darker grey tones. These features are called out as Precambrian schists and gneissoids on the published state and county geologic maps. The geological contacts of these formations agree closely with those shown on the published geological maps of the area.

4. In the vicinity of Newman Peak, approximately 40 miles northwest of Tucson, there are granites and granite gniesses that cannot be subdivided from examining the ERTS imagery, however, to the south (across Highway 84) there is an

exposure of andesite or basalt (taken from the geological map) that has a much darker grey level than the granites. However, similar topographic features having the same grey level contrast to the alluvium are not always andesite or basalt.

5. One major lineation, made up of many parallel lineations, is noticeable just north of Lake Pleasant (lat. 34°'N and long. 112°'W) that extends for approximately 100 miles in a northern direction (N80W) out of the target area as far north as lat. 35° 5'N and long. 112° 8'W. This feature corresponds to a Precambrian schist formation shown on the USGS "Geologic Map of Arizona," scale 1:500,000, 1969. A side lap stereo examination was undertaken to determine if the individual lineations within the 4-mile area are bedding or faults. This attempt was not conclusive at this time, but it is felt that the most likely explanation is that it is bedding, at least in the portion closest to Lake Pleasant.

6. So far most of the regional lineations fall into three general directions: these are northeast, northwest, and north-south in direction. Although not enough imagery has been examined, at this point in time, it seems that the older Precambrian basement predominates in the NE bearing structural trends, whereas the predominate NW trend is most likely associated with the Texas Structural Zone

and the north-south trend being the Utah-Arizona belt and/or part of the southern basin and range province.

7. Comparison between image numbers ERTS E 1049-17324-7 and ERTS E 1067-17324-7 is that the latter imagery, acquired 18 days later, has higher contrast (greater range of grey levels) especially in regards to tracing faults that occur in alluvial fans, that in turn reveals more geologic detail.

Problems:

The first set of 70mm transparencies we received were positives that required an internegative before we could make positive prints. This resulted in a loss of resolution. We have requested negatives to replace them and have also requested 9" x 9" transparencies and an occasional color composite. The latter would help in determining more accurately different geologic formations by the changes in hue along with changes in vegetation boundaries. Numerous newton rings and scratches appear on the negatives that in turn make the enlarged prints difficult to properly interpret.

Although the cloud cover has hindered the interpretation on many prints, the resolution of the MSS exceeds expectations with excellent tone quality.

Underflight photography has not arrived and is needed as an aid in identifying known areas of mineralization and fault intersections.

Publications:

None

Recommendations:

None at this time.

Standing Order:

No changes.

Image Descriptor Form:

Attached

Data Request Forms:

None

Schedule:

No changes.

Funding and Personnel:

No changes.

Plans for Next Reporting Period:

Continuing analysis of ERTS-1 imagery and aircraft underflight photos is planned following receipt of imagery. Also, correlations of lineations to other data displayed on the overlays will be commenced.